The City of New York and the NYC School Construction Authority (SCA) have developed a Preferred Citywide Remedy to address PCB exposures in the school environment. The EPA annotated summary that follows the charge questions below has been extracted from the Summary Report dated May 24, 2013. The complete Summary Report is Attachment 1. The Summary Report was based on the following documents:

FEASIBILITY STUDY FOR THE NEW YORK CITY SCHOOL CONSTRUCTION AUTHORITY PILOT STUDY TO ADDRESS PCB CAULK IN NEW YORK CITY SCHOOL BUILDINGS (Attachment 2)

FINAL REMEDIAL INVESTIGATION REPORT PILOT STUDY TO ADDRESS PCB CAULK IN NYC SCHOOL BUILDINGS (Attachment 3)

Both dated August 21, 2012.

The Summary Report references the NYC collective bargaining agreement with the International Union of Operating Engineers in its description of best management practices for caulk. It is provided as Attachment 4.

In addition, as suggested by Kathleen Grimm in a letter dated June 4, 2013, attached for review is the Re-Occupancy Protocol currently used by the Department of Education when a ballast failure occurs and EPA suggested revisions to the protocol. (Attachment 5 Protocol-EPA suggested revisions-Grimm letter)

BACKGROUND

Polychlorinated biphenyls, or PCBs, are man-made chemicals that persist in the environment and were widely used in construction materials and electrical products prior to 1978. Although Congress banned the manufacture and most uses of PCBs in 1976 and they were phased out in 1978, there is evidence that many buildings across the country constructed or renovated from 1950 to 1978 may have PCBs in the caulk used in interior and exterior locations, sometimes at high concentrations. Other sources of PCBs, such as fluorescent light ballasts, adhesives, paints, and mastic may also be present in buildings. Exposure to these PCBs may occur as a result of their release into the air, dust, surrounding surfaces and soil. Ballast failures may also contribute to the release of PCBs into the classroom environment.

The PCBs in caulk, adhesives, paint and mastic (that are at levels greater than or equal to 50 ppm) are not authorized for use under the Toxic Substances Control Act (TSCA). While TSCA regulations do not require building owners to test for PCBs, if testing of these building materials shows PCB concentrations at or above 50 ppm then the PCBs must be properly disposed of, in accordance with 40 CFR 761.62. The PCBs in non-leaking, intact ballasts are an authorized use and may be disposed of in a properly permitted solid waste landfill. Ballasts containing PCBs which have leaked must be disposed of in a properly permitted hazardous waste landfill or incinerator. Materials contaminated by PCBs that have leaked or migrated from the aforementioned regulated building materials must be disposed of in accordance with 40 CFR 761.61.

New York City has conducted a remedial investigation/feasibility study at 5 NYC schools to evaluate alternative means of dealing with PCB-containing caulk in their schools. The investigation has demonstrated that the PCB-containing caulk is but one of several PCB sources. Emissions of PCBs from caulk and leaking ballasts in light fixtures have also contaminated a wide range of other building materials, which may be re-emitting PCBs into the air. It has also been demonstrated that many areas in the schools are inadequately ventilated.

EPA scientists have been using the data collected by NYC and data collected by our contractors to better understand exposures to children, teachers, and other school workers. EPA is also investigating methods to reduce or eliminate PCB emissions in a school setting.

EPA RESEARCH RESULTS

http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/caulk/caulkresearch.htm

Caulk put in place between 1950 and 1979 may contain as much as 30% PCBs and can emit PCBs into the surrounding air. PCBs from caulk may also contaminate adjacent materials such as masonry or wood.

Fluorescent lighting fixtures that still contain their original PCB-containing light ballasts have exceeded their designed lifespan, and the chance for rupture and emitting PCBs is significant. Sudden rupture of PCB-containing light ballasts may result in exposure to the occupants and may also result in the addition of significant clean-up costs.

Some building materials (e.g., paint and masonry walls) and indoor dust can absorb PCB emissions and become potential secondary sources for PCBs. When the primary PCB-emitting sources are removed, the secondary sources often emit PCBs.

Encapsulation is a containment method that uses a coating material to separate PCB sources from the surrounding environment to reduce surface and air concentrations of PCBs. Encapsulation is only effective at reducing air concentrations to desirable levels when the PCB content in the source is low. Selecting high-performance coating materials is key to effective encapsulation. Multiple layers of coatings enhance the performance of the encapsulation.

EPA has calculated prudent public health levels that maintain PCB exposures below the “reference dose” – the amount of PCB exposure that EPA does not believe will cause harm. EPA’s reference dose (RfD) is 20 ng PCB/kg body weight per day. Indoor air levels are based upon EPA’s understanding of average exposure to PCBs from all other major sources, and were calculated for all ages of children from toddlers in day-care (70ng/m3) to adolescents in high school (600ng/m3) as well as for adult school employees (450ng/m3). Attempts to achieve these risk-based goals for PCBs in schools will potentially involve balancing removal or containment of the PCBs in caulk, light fixtures, secondarily contaminated materials, and improvements in ventilation. Approximately 1 million school children are exposed to PCBs from these sources. The removal and replacement of the light fixtures alone from approximately 750 NYC public schools has been estimated by NYC to cost approximately 800 million dollars. Given the large stakes involved, it is important that the best long-term solutions are identified and implemented.

EPA is tasking our contractor to identify and engage three appropriate peer reviewers, coordinate the distribution of the NYC reports supporting the remedy to the reviewers, and obtain and transmit the individual peer reviewer comments to EPA. It is anticipated that each reviewer will devote up to 40 hours over a 3-week period to review the NYC remedy and to prepare written review comments. The contractor shall transmit to EPA the final written review comments from each reviewer within two business days of receipt of each peer reviewer’s comments.

Charge for Peer Reviewers: The Consent Agreement and Final Order between EPA R2 and The City of New York and the NYC School Construction Authority requires that EPA "convene an independent peer review panel to evaluate the effectiveness of the recommended Preferred Citywide Remedy, as well as supplements or modifications proposed for consideration by EPA, and to make recommendations for appropriate modifications". The reviewer shall review the NYC Preferred Citywide Remedy in accordance with this requirement and shall also formulate independent conclusions and recommendations regarding the following questions:

1. Do the reports clearly and comprehensively describe the sources, environmental levels, and potential exposures for PCBs in school buildings?
2. Please comment on the appropriateness of the remedies selected. Do they provide adequate reductions of the exposure to PCBs? If not, do you have suggestions for additional reductions that could be achieved, given the available data?
3. For each remedy: Does the remedy provide sufficient information to reasonably demonstrate the effectiveness of the proposed remedy? If not, what additional information is needed?
4. For each remedy: Are the methodologies used consistent with the state-of-science? If not, please provide EPA with specific references and suggestions for revision.

5. Does the reviewer have specific recommendations for clarification, explanation, or analysis of data, results, conclusions or other information included in this report?

6. See the annotated Summary Citywide Preferred Remedy for additional charge questions specific to portions of the remedy.

Annotated Summary Preferred Citywide Remedy (EPA charge questions in italics)

The elements of the proposed Preferred Citywide Remedy include:

- **PCB Ballast and Associated Light Fixture Management and Replacement** - The City will continue to implement its ongoing program whereby all light fixtures that use or used PCB ballasts and associated light fixtures in New York City public school buildings are removed and replaced on a prioritized basis. All light fixture replacements projects will be completed by December 31, 2016. (*No specific questions related to this portion. The timeframe is the result of a court settlement.)*

- **Interim Visual Inspection and PCB Response Action Program:** The City will also continue its program whereby T12 lighting fixtures (which may contain PCB ballasts) are inspected on a regular basis by custodial staff for evidence of brownish black residue on any of the following: light diffuser (lens), light housing, or any area directly below lighting fixtures (furniture or floor). If leaks are observed, the fixture and the intact ballast or the ballast alone (if only the ballast has PCBs and there are no stains on the fixture) is removed by an electrician. Finally, procedures are in place and will continue to be implemented for the limited cases when PCB ballast leakage occurs outside the fixture (housing or diffuser) or when smoke is emitted from ballasts. This procedure includes the expedited removal of the ballasts and/or fixtures, aggressive ventilation, and cleaning or removal and disposal of any additional impacted items, with confirmatory wipe sampling for PCBs. Both protocols are annexed hereto and would be interim components of the preferred remedy. *(Are there alternatives to the visual inspection protocol for detecting ballasts that have leaked?*

- *EPA has suggested revising the Re-occupancy protocol to include post clean up air sampling in addition to the current practice of surface wipe sampling for PCBs. Is wipe sampling alone adequate to minimize exposure of students and staff to PCBs.*

- *If sampling for PCBs in air is it possible to achieve a low enough detection limit (detection limit at*

least 50ng/m3) using a passive sampler?

- **Continued Assessment with EPA on Potential Caulk Remedial Measures:** While the measures thus far evaluated in the Pilot Study have yet to yield an effective remedy for PCB caulk, the work performed during the pilot study has yielded invaluable data and information on potential remedial measures designed to address this complex issue. As part of the preferred remedy, the City would like to continue this work under EPA's oversight by performing evaluations of new remedial approaches for PCB caulk. The City would perform this work in schools where fixtures containing PCB light ballasts have already been removed. (*The approaches evaluated thus far include patch and repair, removal and encapsulation. Are there other approaches that may be evaluated?)*

- **Best Management Practices** - The Best Management Practices (BMP), as approved by EPA in April 2012, will be implemented. This includes employing strategies for managing PCB caulk and ensuring safe and proper operation of all heating, air conditioning, ventilating and similar equipment (collectively "HVAC").

  - **PCB caulk Management**- Measures and practices will be used to protect interior and exterior PCB caulk from accidental damage and to identify the potential for deterioration through routine inspections requiring further action on an ongoing basis during school maintenance, repair and renovation. The BMPs also reference remediation of deteriorated PCB caulk by removal and replacement, patch and repair, or encapsulation.
    (Should the caulk management plan address both deteriorated and intact caulk, or should it focus on only one condition of caulk?)

  - **Heating Ventilating and Air Conditioning Maintenance** Building Air exchange rates will be maintained per design by ensuring that the HVAC and general ventilation systems are operating properly in accordance with the requirements contained in Appendix F of the Collective Bargaining Agreement. HVAC and general ventilation supply and exhaust fans will be operated while schools are occupied. Heating stacks, where designed primarily for ventilation rather than heating, shall be used to provide tempered fresh air while buildings are occupied. The City will maintain, adjust and make minor repairs to systems as needed. If there are problems identified with the systems that are beyond the ability of the appropriate building staff to directly rectify, a work request will be submitted on an expedited priority of a time sensitive nature.

    (*The school buildings have been constructed over a period of more than a hundred years and many have been modified during the course of their operation. Air exchange rates under current operating conditions are unknown. Are there procedures, in addition to those specified in the collective bargaining agreement, which would minimize the impact of PCB releases?)*

Removal, Replacement and Encapsulation of Caulk - As presented in the BMP, capital projects to renovate schools will be performed by the New York City School Construction Authority (SCA) in accordance with standard construction specifications which have been developed to properly manage and dispose of PCB caulk when it is disturbed during renovation activities. These protocols require rigorous dust control measures during the work followed by cleaning and inspection at the conclusion of every work shift to minimize the potential exposure to PCB-containing dust during construction. *(The proposal is to remove, replace and/or encapsulate caulk if disturbed during the course of routine construction projects. Would proactively addressing the presence of PCBs city-wide, regardless of*

future construction, significantly reduce exposures? If so what factors are recommended for consideration in identifying buildings that should be prioritized for caulk management activities (e.g., schools with passive ventilation systems, schools with children under 6, Etc.)? Would air sampling be an effective means of confirming a recommended prioritization scheme?)

- **Soil Evaluation, Excavation and Replacement** - SCA will evaluate the presence of PCBs in the surface soil within outside exposure areas (i.e., soil within ten feet of the building face), following the completion of construction projects that disturb exterior PCB caulk. Any surface soil within ten feet of the building found to contain PCBs at a concentration of greater than the 1 ppm guidance value will be the subject of remediation by excavation and off-site disposal. Confirmatory post-excavation soil results will be obtained. After removing contaminated soil, the excavation will be backfilled using clean fill.
  (The proposal is to evaluate soil for the presence of PCB following construction projects that might disturb exterior caulk. Would proactively evaluating the presence of PCBs in the soil at all schools with exterior PCB caulk, regardless of future construction, significantly reduce exposures?)

- **Public Outreach** - The City will implement public outreach pursuant to Local Laws 68 and Local Laws 69 of 2011 (see Appendix A). In addition, the City shall continue to maintain its updated website, which provides email updates to those who request such notices. The website will, among other things, provide information on the City's progress to remove PCB light fixtures. (*No specific questions related to this portion. These are terms of the CAFO.)*

Finally, due to existing limitations and data gaps associated with managing PCBs in school buildings additional studies are recommended in the areas of long-term monitoring, encapsulation of caulk and substrate, and activated carbon air filtration. It is anticipated that the proposed approach to managing PCBs in the schools will be subject to change based on future data collection and data evaluation. *(Do the reviewers perceive data gaps or limitations not identified by NYC?)*